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HONEYWELL INTERNATIONAL INC.
101 COLUMBIA ROAD
P O BOX 2245
MORRISTOWN, NJ 07962-2245

EXAMINER	
BERTHEAUD, PETER JOHN	

ART UNIT	PAPER NUMBER
3746	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,517	BONNE, ULRICH	
	Examiner	Art Unit	
	PETER J. BERTHEAUD	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-54* is/are pending in the application.

4a) Of the above claim(s) *31-35* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,16,17,19,20,22-30 and 36* is/are rejected.

7)☒ Claim(s) *15,18 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to Amendments filed 2/21/2008. It is noted that claims 1, 22, 25, and 53 have been amended.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 13 and 50-52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 13, the two ends of an electrode (which would be within one layer) are said to have two different thicknesses of film. How is this possible? This claim needs revision in order to agree with the amendments made to claim 1. Applicant argues that claim 13 is dependant on claim 1 which discloses two electrodes "hence two thicknesses", which it does; however, claim 13 is directly dependant on claim 3, which states "the sharp-like conductor ends and non-sharp-like conductor ends are situated in the first conductive layer". Therefore, the two ends of an electrode (which would be within one layer according to claim 3) are said to have two different thicknesses of film. How is this possible?

3. Examiner still maintains that in Claim 50, the phrase "A means for ion pumping, comprising: means for providing an electrical discharge; means for enclosing the means for providing an electrical discharge" is indefinite. This "means" could all be the same

element or could be referring to different elements; therefore, it does not distinctly claim the subject matter of the invention.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 22-30, 36-41, 50, and 53-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Reader 3,554,669.

Reader discloses an electric-fluid energy converter comprising a flow channel 16, 20, a non-conducting insulating layer 24; a first conductive layer or material 12 situated on a first side of the insulating layer; a second conductive layer or material 14 situated on a second side of the insulating layer 24; the first conductive layer or material has a tapered contour 18 or angular projection into the channel 18; the first and second discharge device electrodes, energized by a voltage, provide an electrical discharge (see col. 3, lines 4-5); and an enclosure 26, 28 containing the channels and having an input port proximate to an input side of the plurality of openings and an output port proximate to an output side of the plurality of openings (see col. 1, lines 20-24). Reader further discloses that a flow direction of the flow channel is approximately parallel to the elongated dimension through the non-conducting spacer material 24, and proceeding from a upstream tapered first conductive material or angular projection 18 to a

downstream blunt conductive material 22 through the non-conducting spacer material 24, wherein the conductive materials are electrodes (see col. 2, lines 43-45) forming a discharge device. Reader also discloses that each pumping element of the plurality of pumping elements comprises: a first orifice 16 upstream in a first electrode plate 12; a second orifice 20 downstream in a second electrode plate 14; and a layer of insulating material 24 situated between the first and second electrode plates and having an opening between the first and second orifices (see opening provided by 24 in Figs. 1-2B); and wherein the first orifice has an upstream sharp-like contour (front of 18). Reader also discloses a plurality of flow channels 16, 20 having the first 12 and second 14 conductive materials; wherein the flow channels form an array in a plane and an axis of each flow channel is approximately perpendicular to the plane (see channel configuration in Figs. 1-2B). Reader further discloses that the first portion of a plurality of channels 16, 20 has the first conductive material 12 on a first side of the plane proximate to the input port and the second conductive material 14 on a second side of the plane proximate to the outlet port (see col. 1, lines 20-24). Reader also discloses that the first orifice 16 of each pumping element is capable of producing an ionizing corona due to the sharpness of the front end of 18 in reference to 22; this creates a higher gradient than elsewhere in the flow channel giving the configuration the potential to provide a corona of ions. Reader further discloses that the sharp-like conductor openings comprise a conductive electrode, thin-film material 12. Reader also discloses that the plurality of openings is fabricated by etching (see col.3, lines 31-34). Reader further discloses that the pump is operated like a valve by adjusting an applied voltage

across the first and second discharge device electrodes to oppose and balance an external flow and pressure (see col. 3, lines 4-14).

In reference to claims 53 and 54, Reader discloses an insulating layer 24; a first conductive layer 12 situated on a first upstream side of the insulating layer 24; a second conductive layer 14 situated on a second downstream side of the insulating layer; a plurality of openings 16, 20 situated in the first conductive layer, the insulating layer and the second conductive layer forming channels having first upstream and second downstream discharge device electrodes, respectively, wherein the openings 16 in the first conductive layer 12 at the first discharge device electrodes are upstream and are formed by a sharp point (see rear end of projections 18) in the conductive layer; and an enclosure 26, 28 containing the channels and having an input port proximate to the first conductive layer 12 and an output port proximate to the second conductive layer 14 (the art still reads on the claim because the rear end projection of 18 are still on the upstream side of the insulating layer); wherein the first discharge electrodes have a configuration to generate in-situ ions to induce a fluid flow.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-5, 9-12, 14, 16, 17, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Reader 3,554,669.

Reader discloses an electric-fluid energy converter comprising a flow channel 16, 20, a non-conducting insulating layer 24; a first conductive layer or material 12 situated on a first side of the insulating layer; a second conductive layer or material 14 situated on a second side of the insulating layer 24; the first conductive layer or material has a prominent like contour 18 or projection into the channel 18; a plurality of openings 16, 20 situated in the first conductive layer 12, the insulating layer 24 and the second conductive layer 14 forming channels having first 18 and second 20 discharge device electrodes, wherein the first electrode has a sharp-like shape at an upstream end, wherein the plurality of openings are grouped into upstream inputs and downstream outputs, and the openings situated at inputs are formed by upstream sharp-like conductor ends; the first and second discharge device electrodes, energized by a voltage, provide an electrical discharge (see col. 3, lines 4-5); and an enclosure 26, 28 containing the channels and having an input port proximate to an input side of the plurality of openings and an output port proximate to an output side of the plurality of openings (see col. 1, lines 20-24). Reader also discloses that the fluid in the enclosure can be transported between the input port and the output port by being forced through the plurality of openings (see col. 1, lines 20-24). Reader further discloses that the sharp-like conductor ends and downstream conductor ends are situated in the first conductive layer, the first discharge electrodes 18 have a configuration to generate in-situ ions proximate to the sharp-like conductor ends; the in-situ ions predominantly have

the polarity of the sharp-like conductor ends, which then induce a fluid flow of neutral molecules as a result of a force and viscous drag of the in-situ ions and away from the sharp-like conductor ends. Reader also discloses that the plurality of openings is grouped into first and second stages (see Fig. 3); the stages are arranged in a flow series. Reader further discloses that the openings situated at inputs of the first and second stages are formed by sharp-like conductor ends 34a, 34b; and the openings situated at outputs of the first and second stages are formed by downstream conductor ends 40a, 40b; and the first and second stages are in separate chambers (separated by 44c). Reader also discloses that the first orifice 16 of each pumping element is capable of producing an ionizing corona due to the sharpness of the front end of 18 in reference to 22; this creates a higher gradient than elsewhere in the flow channel giving the configuration the potential to provide a corona of ions. Reader further discloses that the sharp-like conductor ends comprise a conductive electrode, thin-film material 12. Reader also discloses that the plurality of openings is fabricated by etching (see col.3, lines 31-34). Reader further discloses that the pump is operated like a valve by adjusting an applied voltage across the first and second discharge device electrodes to oppose and balance an external flow and pressure (see col. 3, lines 4-14).

In reference to claims 16 and 17; while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function, because apparatus claims cover what a device is, not what a device does (Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990)). Thus, if a prior art

structure is capable of performing the intended use as recited in the preamble, or elsewhere in a claim, then it meets the claim, as has been shown above to be the instant case.

In reference to the newly amended portion of claim 1, Reader teaches the claimed invention except for the first electrode having a blunt downstream end, or the openings situated at the outputs being formed by downstream non-sharp-like conductor ends. It would have been an obvious matter of design choice to make the downstream ends of the electrodes with non-sharp-like ends, since such a modification would have involved a mere change in the shape of the component. The Applicant has provided a reason for the upstream ends to be sharp-like; however, there is no reason given as to why the downstream ends of the first and second electrodes has to be non-sharp-like. Therefore, a change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955) (see MPEP 2144.04 – IV Changes in Size, Shape, or Sequence of Adding Ingredients).

8. Claims 6-8 and 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reader 3,554,669 in view of Tennent 6,031,711.

Reader discloses the invention as discussed above. However, Reader does not teach the following claimed limitations taught by Tennent.

Tennent teaches the use of nanotube whiskers (fibers) in conducting electrodes for providing an electrical discharge (see abstract and col. 4, lines 1-4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the pump of Reader by implementing nanotube whiskers into the

electrodes in order to increase electrical performance as well as the structural integrity of the electrodes (Tennent, see abstract).

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reader 3,554,669.

Reader discloses the claimed invention except for the sharp-like conductor openings comprising 10 to 100 nm-think films and the non-sharp-like openings comprising 100-10,000 nm-thick films of conductive material; and rounded inner diameter edges. It would have been an obvious matter of design choice to make films within these parameters, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955) (see MPEP 2144.04 – IV Changes in Size, Shape, or Sequence of Adding Ingredients).

10. Claims 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reader 3,554,669 in view of Fischer 6,583,407.

Reader discloses the invention as discussed above. However, Reader does not teach the following claimed limitations taught by Fischer.

Fischer teaches a method and apparatus for ion delivery comprising a first electrode 20 and a second electrode 22. Fischer further teaches a method for controlling fluid flow with the at least one set of first and second electrodes to achieve pulses of sample analyte into a gas analyzer and/or out of a gas analyzer, the gas analyzer being of gas chromatography (see col. 1, lines 15-25 and col. 9, lines 7-16).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the pump of Reader by moving sample analyte by pulse into a gas analyzer in order to selectively delivery ions that have a wide range of properties (Fischer, col. 1, lines 15-27).

11. Claims 42-46 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reader 3,554,669 in view of Henoch 6,106,236.

Reader teaches a method providing at least one set of first upstream 12 and second downstream 14 electrodes separated by a distance; containing the at least one set of first and second electrodes in an enclosure 26, 28 having an input and an output; the first electrode 18 being shaped so as to be suitable for providing a corona of ionization due to the sharpness of the front end (upstream) of 18 in reference to 22; this creates a higher gradient than elsewhere in the flow channel giving the configuration the potential to provide a corona of ions; and applying a DC voltage to the at least one set of first and second electrodes which could result in a corona at the first electrode; and wherein the corona may generate ions to induce a fluid flow in the enclosure (see col. 2, lines 65-72 and col. 3, lines 1-3). Reader further teaches a method comprising completing the at least one set of first 32a and second 40a electrodes to ignite the discharge with a second set of electrodes 32b, 40b that could generate an ion drift. Reader also teaches a method wherein a negative electrode attracts mostly positive and heavy ions, a positive electrode attracts mostly negative ions, generated by an attachment of electrons which is a lower-energy process than a process of removing an electron from a neutral molecule (see col. 2, lines 55-69), and adjusting the voltages to

provide valve-like control of the fluid flow (see col. 3, lines 4-14). However, Reader does not teach the following claimed limitations taught by Henoch.

Henoch teaches a fluid conduit comprising a first electrode 12 and a second electrode 14. Henoch further teaches a method for applying and using an AC voltage 16 to generate ions in an electroless operation and a DC field 24 to accelerate the ions of the fluid in the direction of a desired flow (see col. 2, lines 54-66).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the pump of Reader by using an AC voltage as well as a DC voltage in order to reduce flow friction (Henoch, col. 2, lines 54-66).

12. Claims 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reader 3,554,669 in view of Henoch 6,106,236 and in further view of Fischer 6,583,407.

Reader in view of Henoch discloses the invention as discussed above. However, Reader in view of Henoch does not teach the following claimed limitations taught by Fischer.

Fischer teaches a method and apparatus for ion delivery comprising a first electrode 20 and a second electrode 22. Fischer further teaches a method for controlling fluid flow with the at least one set of first and second electrodes to achieve pulses of sample analyte into a gas analyzer and/or out of a gas analyzer, the gas analyzer being of gas chromatography (see col. 1, lines 15-25 and col. 9, lines 7-16).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the pump of Reader in view of Henoch by moving sample analyte by pulse into a gas analyzer in order to selectively delivery ions that have a wide range of properties (Fischer, col. 1, lines 15-27).

Allowable Subject Matter

13. Claims 15, 18, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

14. Applicant's arguments filed 2/21/2008 have been fully considered but they are not persuasive.

15. In response to Applicant's arguments with respect to independent claim 1: Examiner maintains the 103 rejection with respect to design choice. Applicant states that the amendments to claim 1, which limit the downstream ends of the electrodes to be blunt or non-sharp-like, have support in the specification, specifically this excerpt:

> "The openings 46 on the first conductive layer 32 may have a sharp-like configuration, and the openings 47 on the second conductive layer 31 may have a non-sharp-like configuration. This arrangement provides for predominant generation of in-situ ions proximate to the sharp-edged conductor openings 46. The ions then bear predominantly the polarity of those sharp edges, which then may induce a fluid 55 flow of neutral molecules as a result of the force and viscous drag of those predominant ions."

However, this alleged support is for the front end being "sharp-like", not for the back end being non-sharp-like. It simply states the fact that the back end of the electrode is non-

sharp-like, but does not give any reason why. Furthermore, the term blunt is never used in the "support", only the term non-sharp-like. Applicant further argues that Reader teaches away from the design choice because Reader states that "at the downstream end of the emitter 12, the sharp tips 18a serve to easily allow excess electrons to flow therefrom and attach themselves to molecules of the fluid within the device to form ions." Examiner contends that if a very small portion of the point on the downstream ends of the electrodes in Reader was cut off, leaving blunt ends, the device would function identically. Therefore, the art of Reader still reads on the claim.

16. In response to Applicant's arguments with respect to independent claims 22, 25, 36, and 42: Examiner maintains that angular projection or tapered contour 18 in Reader does indeed have a sharp-like or tapered upstream projection. Just because the front side of 18 does not come to a point does not mean it is not "sharp-like" or tapered in some way. One of ordinary skill would indeed equate the rounded tip of Reader to a "sharp-like" tip because the term "sharp-like" is not limited to a point or tip; it is a relative term and therefore is up for interpretation. Furthermore, the flow in Reader most definitely goes from an upstream tapered conductive material (see front of 18) to a downstream blunt conductive material (see front of 22, keep in mind that, again, the term blunt is relative and leaves the limitation up for interpretation). Therefore, the reference still reads on the claims.

17. In response to Applicant's arguments with respect to claim 53: Reader does indeed disclose that the openings in the first conductive layer 12 are formed by a sharp point in the conductive layer. The sharp points of 12 are still in the first conductive layer

and they form openings upstream of 22 and the insulating layer. Thus, Reader reads on the claim.

Conclusion

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER J. BERTHEAUD whose telephone number is (571)272-3476. The examiner can normally be reached on M-F 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3683

PJB
/Peter J Bertheaud/
Examiner, Art Unit 3746